



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,322	01/17/2007	Daisuke Hirokane	295408US40PCT	3313
22850 7590 04/03/2009 OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER FEELY, MICHAEL J	
			ART UNIT 1796	PAPER NUMBER
			NOTIFICATION DATE 04/03/2009	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No. 10/594,322	Applicant(s) HIROKANE, DAISUKE	
	Examiner Michael J. Feely	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>20060927</u> . | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 1796

DETAILED ACTION

Pending Claims

Claims 1-5 are pending.

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuo (JP 2002-161193) in view of Shimizu et al. (US Pat. No. 5,919,844).

Regarding claims 1-5, Matsuo discloses: **(1)** an epoxy resin composition for encapsulating semiconductors (Abstract) comprising: (A) an epoxy resin (Abstract; paragraph 0006), (B) a phenol resin (Abstract; paragraph 0007), (C) an inorganic filler (Abstract; paragraph 0010), (D) a curing accelerator (Abstract; paragraph 0008), and (E) a glycerol tri-fatty acid ester produced by dehydration condensation reaction of glycerol and a saturated fatty acid with a carbon atom content of 24-36 (Abstract; paragraph 0009); and **(5)** a semiconductor device

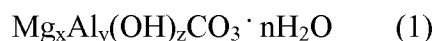
Art Unit: 1796

comprising a semiconductor element encapsulated using the epoxy resin composition according to claim 1 (Abstract; paragraph 0005).

Matsuo fails to disclose: **(1-4)** (F) a hydrotalcite compound.

Shimizu et al. disclose a similar encapsulating composition (*see Abstract; claims*).

Furthermore they disclose the use of: **(1)** (F) a hydrotalcite compound (column 8, line 30 through column 9, line 43); **(2)** wherein the hydrotalcite compound is a compound shown by the following formula (1) and/or its sintered material,



wherein x, y, z, and n are positive numbers (column 9, lines 1-37); **(3)** wherein the hydrotalcite compound is a hydrotalcite of the above formula (1) in which $0.15 \leq (y/x+y) \leq 0.35$, $1.8 \leq (z/x+y) \leq 2.5$, and $0 \leq n \leq 5$ and/or its sintered material (column 9, lines 1-37); and **(4)** wherein the hydrotalcite compound is a compound shown by the formula $\text{Mg}_6\text{Al}_2(\text{OH})_{16}\text{CO}_3 \cdot 4\text{H}_2\text{O}$ (column 9, lines 26-37). The hydrotalcite acts as an ion capturing agent and provides *enhanced humidity stability* to the encapsulating composition.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the instantly claimed hydrotalcite compound, as taught by Shimizu et al., to the encapsulating composition of Matsuo because Shimizu et al. disclose a similar encapsulating composition, wherein hydrotalcite is added as an ion capturing agent. The presence of the hydrotalcite provides enhanced humidity stability to the encapsulating composition.

4. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuo (JP 2002-161193) in view of Maeda et al. (US Pat. No. 6,190,787).

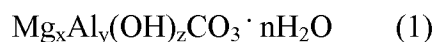
Art Unit: 1796

Regarding claims 1-5, Matsuo discloses: **(1)** an epoxy resin composition for encapsulating semiconductors (Abstract) comprising: (A) an epoxy resin (Abstract; paragraph 0006), (B) a phenol resin (Abstract; paragraph 0007), (C) an inorganic filler (Abstract; paragraph 0010), (D) a curing accelerator (Abstract; paragraph 0008), and (E) a glycerol tri-fatty acid ester produced by dehydration condensation reaction of glycerol and a saturated fatty acid with a carbon atom content of 24-36 (Abstract; paragraph 0009); and **(5)** a semiconductor device comprising a semiconductor element encapsulated using the epoxy resin composition according to claim 1 (Abstract; paragraph 0005).

Matsuo fails to disclose: **(1-4)** (F) a hydrotalcite compound.

Maeda et al. disclose a similar encapsulating composition (*see Abstract; claims*).

Furthermore they disclose the use of: **(1)** (F) a hydrotalcite compound (column 6, line 41 through column 7, line 8); **(2)** wherein the hydrotalcite compound is a compound shown by the following formula (1) and/or its sintered material,



wherein x, y, z, and n are positive numbers (column 6, lines 50-55: *formula 6*); **(3)** wherein the hydrotalcite compound is a hydrotalcite of the above formula (1) in which $0.15 \leq (y/x+y) \leq 0.35$, $1.8 \leq (z/x+y) \leq 2.5$, and $0 \leq n \leq 5$ and/or its sintered material (column 6, lines 50-55: *formula 6 obviously embraces these ranges*); and **(4)** wherein the hydrotalcite compound is a compound shown by the formula $\text{Mg}_6\text{Al}_2(\text{OH})_{16}\text{CO}_3 \cdot 4\text{H}_2\text{O}$ (column 6, lines 50-55: *formula 6 obviously embraces this embodiment*). The hydrotalcite acts as an ion scavenger and prevents corrosion of aluminum circuits and pads.

Art Unit: 1796

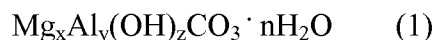
Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the instantly claimed hydrotalcite compound, as taught by Maeda et al., to the encapsulating composition of Matsuo because Maeda et al. disclose a similar encapsulating composition, wherein hydrotalcite is added as an ion scavenger. The presence of the hydrotalcite prevents corrosion of aluminum circuits and pads.

5. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirokane (JP 2002-080695) in view of Shimizu et al. (US Pat. No. 5,919,844).

Regarding claims 1-5, Hirokane discloses: *(1)* an epoxy resin composition for encapsulating semiconductors (Abstract) comprising: (A) an epoxy resin (Abstract; paragraph 0007), (B) a phenol resin (Abstract; paragraph 0008), (C) an inorganic filler (Abstract; paragraph 0010), (D) a curing accelerator (Abstract; paragraph 0009), and (E) a glycerol tri-fatty acid ester produced by dehydration condensation reaction of glycerol and a saturated fatty acid with a carbon atom content of 24-36 (Abstract; paragraph 0011); and *(5)* a semiconductor device comprising a semiconductor element encapsulated using the epoxy resin composition according to claim 1 (Abstract; paragraph 0006).

Hirokane fails to disclose: *(1-4)* (F) a hydrotalcite compound.

Shimizu et al. disclose a similar encapsulating composition (*see Abstract; claims*). Furthermore they disclose the use of: *(1)* (F) a hydrotalcite compound (column 8, line 30 through column 9, line 43); *(2)* wherein the hydrotalcite compound is a compound shown by the following formula (1) and/or its sintered material,



Art Unit: 1796

wherein x, y, z, and n are positive numbers (column 9, lines 1-37); **(3)** wherein the hydrotalcite compound is a hydrotalcite of the above formula (1) in which $0.15 \leq (y/x+y) \leq 0.35$, $1.8 \leq (z/x+y) \leq 2.5$, and $0 \leq n \leq 5$ and/or its sintered material (column 9, lines 1-37); and **(4)** wherein the hydrotalcite compound is a compound shown by the formula $Mg_6Al_2(OH)_{16}CO_3 \cdot 4H_2O$ (column 9, lines 26-37). The hydrotalcite acts as an ion capturing agent and provides *enhanced humidity stability* to the encapsulating composition.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the instantly claimed hydrotalcite compound, as taught by Shimizu et al., to the encapsulating composition of Hirokane because Shimizu et al. disclose a similar encapsulating composition, wherein hydrotalcite is added as an ion capturing agent. The presence of the hydrotalcite provides enhanced humidity stability to the encapsulating composition.

6. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirokane (JP 2002-080695) in view of Maeda et al. (US Pat. No. 6,190,787).

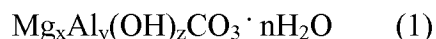
Regarding claims 1-5, Hirokane discloses: **(1)** an epoxy resin composition for encapsulating semiconductors (Abstract) comprising: (A) an epoxy resin (Abstract; paragraph 0007), (B) a phenol resin (Abstract; paragraph 0008), (C) an inorganic filler (Abstract; paragraph 0010), (D) a curing accelerator (Abstract; paragraph 0009), and (E) a glycerol tri-fatty acid ester produced by dehydration condensation reaction of glycerol and a saturated fatty acid with a carbon atom content of 24-36 (Abstract; paragraph 0011); and **(5)** a semiconductor device comprising a semiconductor element encapsulated using the epoxy resin composition according to claim 1 (Abstract; paragraph 0006).

Art Unit: 1796

Hirokane fails to disclose: **(1-4)** (F) a hydrotalcite compound.

Maeda et al. disclose a similar encapsulating composition (*see Abstract; claims*).

Furthermore they disclose the use of: **(1)** (F) a hydrotalcite compound (column 6, line 41 through column 7, line 8); **(2)** wherein the hydrotalcite compound is a compound shown by the following formula (1) and/or its sintered material,



wherein x, y, z, and n are positive numbers (column 6, lines 50-55: *formula 6*); **(3)** wherein the hydrotalcite compound is a hydrotalcite of the above formula (1) in which $0.15 \leq (y/x+y) \leq 0.35$, $1.8 \leq (z/x+y) \leq 2.5$, and $0 \leq n \leq 5$ and/or its sintered material (column 6, lines 50-55: *formula 6 obviously embraces these ranges*); and **(4)** wherein the hydrotalcite compound is a compound shown by the formula $\text{Mg}_6\text{Al}_2(\text{OH})_{16}\text{CO}_3 \cdot 4\text{H}_2\text{O}$ (column 6, lines 50-55: *formula 6 obviously embraces this embodiment*). The hydrotalcite acts as an ion scavenger and *prevents corrosion* of aluminum circuits and pads.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the instantly claimed hydrotalcite compound, as taught by Maeda et al., to the encapsulating composition of Hirokane because Maeda et al. disclose a similar encapsulating composition, wherein hydrotalcite is added as an ion scavenger. The presence of the hydrotalcite prevents corrosion of aluminum circuits and pads.

7. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toyosawa (JP 2002-212393) in view of Shimizu et al. (US Pat. No. 5,919,844).

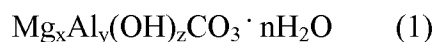
Art Unit: 1796

Regarding claims 1-5, Toyosawa discloses: **(1)** an epoxy resin composition for encapsulating semiconductors (Abstract) comprising: (A) an epoxy resin (Abstract; paragraph 0009), (B) a phenol resin (Abstract; paragraph 0010), (C) an inorganic filler (Abstract; paragraph 0012), (D) a curing accelerator (Abstract; paragraph 0011), and (E) a glycerol tri-fatty acid ester produced by dehydration condensation reaction of glycerol and a saturated fatty acid with a carbon atom content of 24-36 (Abstract; paragraph 0013); and **(5)** a semiconductor device comprising a semiconductor element encapsulated using the epoxy resin composition according to claim 1 (Abstract; paragraph 0008).

Toyosawa fails to disclose: **(1-4)** (F) a hydrotalcite compound.

Shimizu et al. disclose a similar encapsulating composition (*see Abstract; claims*).

Furthermore they disclose the use of: **(1)** (F) a hydrotalcite compound (column 8, line 30 through column 9, line 43); **(2)** wherein the hydrotalcite compound is a compound shown by the following formula (1) and/or its sintered material,



wherein x, y, z, and n are positive numbers (column 9, lines 1-37); **(3)** wherein the hydrotalcite compound is a hydrotalcite of the above formula (1) in which $0.15 \leq (y/x+y) \leq 0.35$, $1.8 \leq (z/x+y) \leq 2.5$, and $0 \leq n \leq 5$ and/or its sintered material (column 9, lines 1-37); and **(4)** wherein the hydrotalcite compound is a compound shown by the formula $\text{Mg}_6\text{Al}_2(\text{OH})_{16}\text{CO}_3 \cdot 4\text{H}_2\text{O}$ (column 9, lines 26-37). The hydrotalcite acts as an ion capturing agent and provides *enhanced humidity stability* to the encapsulating composition.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the instantly claimed hydrotalcite compound, as taught by Shimizu et al., to the

Art Unit: 1796

encapsulating composition of Toyosawa because Shimizu et al. disclose a similar encapsulating composition, wherein hydrotalcite is added as an ion capturing agent. The presence of the hydrotalcite provides enhanced humidity stability to the encapsulating composition.

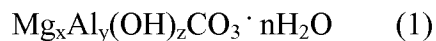
8. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toyosawa (JP 2002-212393) in view of Maeda et al. (US Pat. No. 6,190,787).

Regarding claims 1-5, Toyosawa discloses: **(1)** an epoxy resin composition for encapsulating semiconductors (Abstract) comprising: (A) an epoxy resin (Abstract; paragraph 0009), (B) a phenol resin (Abstract; paragraph 0010), (C) an inorganic filler (Abstract; paragraph 0012), (D) a curing accelerator (Abstract; paragraph 0011), and (E) a glycerol tri-fatty acid ester produced by dehydration condensation reaction of glycerol and a saturated fatty acid with a carbon atom content of 24-36 (Abstract; paragraph 0013); and **(5)** a semiconductor device comprising a semiconductor element encapsulated using the epoxy resin composition according to claim 1 (Abstract; paragraph 0008).

Toyosawa fails to disclose: **(1-4)** (F) a hydrotalcite compound.

Maeda et al. disclose a similar encapsulating composition (*see Abstract; claims*).

Furthermore they disclose the use of: **(1)** (F) a hydrotalcite compound (column 6, line 41 through column 7, line 8); **(2)** wherein the hydrotalcite compound is a compound shown by the following formula (1) and/or its sintered material,



wherein x, y, z, and n are positive numbers (column 6, lines 50-55: *formula 6*); **(3)** wherein the hydrotalcite compound is a hydrotalcite of the above formula (1) in which $0.15 \leq (y/x+y) \leq 0.35$,

Art Unit: 1796

$1.8 \leq (z/x+y) \leq 2.5$, and $0 \leq n \leq 5$ and/or its sintered material (column 6, lines 50-55: *formula 6 obviously embraces these ranges*); and **(4)** wherein the hydrotalcite compound is a compound shown by the formula $\text{Mg}_6\text{Al}_2(\text{OH})_{16}\text{CO}_3 \cdot 4\text{H}_2\text{O}$ (column 6, lines 50-55: *formula 6 obviously embraces this embodiment*). The hydrotalcite acts as an ion scavenger and *prevents corrosion* of aluminum circuits and pads.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the instantly claimed hydrotalcite compound, as taught by Maeda et al., to the encapsulating composition of Toyosawa because Maeda et al. disclose a similar encapsulating composition, wherein hydrotalcite is added as an ion scavenger. The presence of the hydrotalcite prevents corrosion of aluminum circuits and pads.

Art Unit: 1796

Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Feely whose telephone number is (571)272-1086. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Y. Pyon can be reached on 571-272-1498. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael J Feely/
Primary Examiner, Art Unit 1796

March 28, 2009